

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application. The following listing provides the amended claims with the amendments marked with deleted material in crossed out and new material underlined to show the changes made.

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**Listing of Claims:**

1. (Currently Amended) A method of pre-computing routes for nets in a region of a circuit layout, the method comprising:

- a) defining a set of partitioning lines for partitioning the region into a plurality of sub-regions during a routing operation;
- 10 b) identifying a primary set of sub-regions that has more than one sub-region;
- c) determining whether the primary set of sub-regions is an open set that has a sub-region that is not adjacent to any other sub-region in the set; and
- d) if the primary set of sub-regions is not an open set,  
identifying a route that connects the sub-regions in the primary set;

15 and

storing the identified route for the primary set of sub-regions.

2. (Original) The method of claim 1 further comprising:

identifying multiple routes that traverse the sub-regions in the primary set when the primary set of sub-regions is not an open set.

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3. (Original) The method of claim 2, wherein the routes are minimum trees, where each tree traverses the sub-regions in the primary set.

4. (Currently Amended) The method of claim 1 further comprising:

if the primary set of sub-regions is an open set,

identifying a connection set of sub-regions that when combined with the primary set forms a closed set of sub-regions that (i) does not have any sub-region that is not adjacent to at least one other another sub-region in the closed set, and (ii) can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-  
5 regions in the primary and connection sets of sub-regions; and

storing at least either the connection set of sub-regions or the closed set of sub-regions for the primary set of sub-regions.

5. (Currently Amended) The method of claim 4 further comprising:

when the primary set of sub-regions is an open set, identifying and storing  
10 multiple connection set of sub-regions for the primary set of sub-regions, wherein each connection set when combined with the primary set forms a closed set of sub-regions that (i) does not have any sub-region that is not adjacent to at least one other another sub-region in the closed set, and (ii) can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-regions in the primary and connection sets of sub-regions.

15 6. (Currently Amended) The method of claim 1 further comprising:

a) identifying several primary sets of sub-regions, wherein each primary set of sub-regions has more than one sub-region; and

b) for each primary set,

determining whether the primary set is an open set that has a sub-  
20 region that is not adjacent to any other sub-region in the set; and

if the primary set of sub-regions is not an open set, (i) identifying a route that connects the sub-regions in the primary set, and (ii) storing the identified route for the primary set of sub-regions.

7. (Original) The method of claim 6 further comprising:

for each of a plurality of the primary sets, identifying multiple routes that traverse the sub-regions in the primary set when the primary set of sub-regions is not an open set.

8. (Original) The method of claim 7, wherein the routes are minimum trees.

9. (Currently Amended) The method of claim 6 further comprising:

5 if a primary set of sub-regions is an open set,

identifying a connection set of sub-regions that when combined with the primary set forms a closed set of sub-regions that (i) does not have any sub-region that is not adjacent to at least one other another sub-region in the closed set, and (ii) can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-regions in the primary and connection sets of sub-regions; and

10 regions in the primary and connection sets of sub-regions; and

storing at least either the connection set of sub-regions or the closed set of sub-regions for the primary set of sub-regions.

10. (Currently Amended) The method of claim 9 further comprising:

when a first primary set of sub-regions is an open set, identifying and 15 storing multiple connection set of sub-regions for the first primary set of sub-regions, wherein each connection set when combined with the first primary set forms a closed set of sub-regions that (i) does not have any sub-region that is not adjacent to at least one other another sub-region in the closed set, and (ii) can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-regions in the primary and connection sets of sub-regions.

20 regions.

11. (Original) The method of claim 6, wherein a plurality of paths exist between the sub-regions defined by the set of partitioning lines, wherein the routes are defined with respect to the paths.

12. (Original) The method of claim 11, wherein a plurality of the paths are diagonal paths, wherein some of the routes traverse some of the diagonal paths.

13. (Original) The method of claim 6, wherein a plurality of edges exist between the sub-regions defined by the set of partitioning lines, wherein the routes are defined with 5 respect to the paths.

14. (Original) The method of claim 13, wherein a plurality of the edges between the sub-regions are diagonal edges, wherein some of the routes intersect some of the diagonal edges.

15. (New) A method of pre-computing routes for nets in a layout region that is 10 partitioned into a plurality of sub-regions, the method comprising:

- a) identifying a primary set of sub-regions that has more than one sub-region;
- b) when the primary set of sub-regions is not an open set that has a sub-region that is not adjacent to any other sub-region in the set, identifying and storing a route that connects the sub-regions in the primary set; and
- 15 c) when the primary set of sub-regions is an open set that has a sub-region that is not adjacent to any other sub-region in the set, storing a set of indicia that enables the generation of a route for the primary set during a routing operation.

16. (New) The method of claim 15 further comprising identifying multiple routes that traverse the sub-regions in the primary set when the primary set of sub-regions is not an open set.

20 17. (New) The method of claim 16, wherein the routes are minimum trees, where each tree traverses the sub-regions in the primary set.

18. (New) The method of claim 15, wherein the set of indicia includes a connection set of sub-regions that when combined with the primary set forms a closed set of sub-regions that does not have any sub-region that is not adjacent to at least one other sub-region in the closed set.

19. (New) The method of claim 18, wherein during the routing operation, a route for the primary set of sub-regions is identified by combining the primary set of sub-regions with the connection set of sub-regions to obtain the closed set of sub-regions and retrieving a route stored for the closed set of sub-regions.

5 20. (New) The method of claim 15, wherein the set of indicia is a closed set of sub-regions that is formed by combining the primary set of sub-regions with a connection set of sub-regions, wherein the closed set of sub-regions does not have any sub-region that is not adjacent to at least one other sub-region in the closed set.

10 21. (New) The method of claim 20, wherein during the routing operation, a route for the primary set of sub-regions is identified by retrieving a route stored for the closed set of sub-regions.

22. (New) A computer readable medium that stores a computer program for pre-computing routes for nets in a layout region that is partitioned into a plurality of sub-regions, the computer program comprising sets of instructions for:

15 a) identifying a primary set of sub-regions that has more than one sub-region;  
b) when the primary set of sub-regions is not an open set that has a sub-region that is not adjacent to any other sub-region in the set, identifying and storing a route that connects the sub-regions in the primary set; and  
c) when the primary set of sub-regions is an open set that has a sub-region  
20 that is not adjacent to any other sub-region in the set, storing a set of indicia that enables the generation of a route for the primary set during a routing operation.